

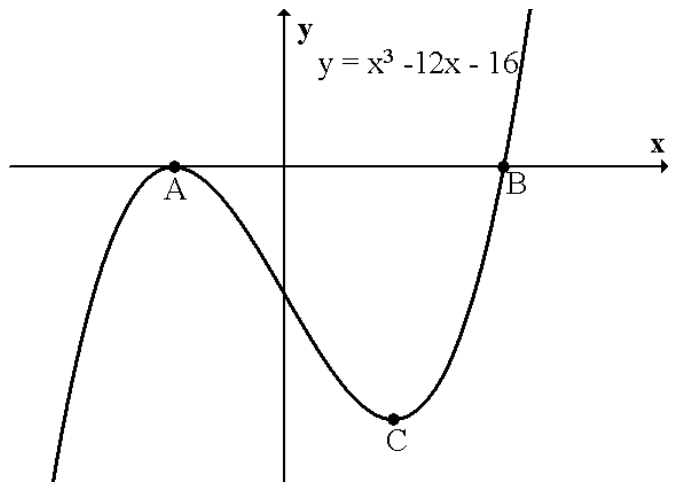
Higher Mathematics
Supported Study 8

1. (a) Express $y = x^2 - 10x + 17$ in the form $y = (x - a)^2 + b$.
(b) Hence, or otherwise, sketch the curve $y = x^2 - 10x + 17$ showing clearly where the curve cuts the y-axis and its turning point.
2. (a) Express $y = 2x^2 + 12x + 3$ in the form $y = a(x + b)^2 + c$.
(b) Write down the turning point of $y = 2x^2 + 12x + 3$ stating whether it is a maximum or a minimum.
3. (a) Express $f(x) = 5 - 4x - x^2$ in the form $f(x) = a(x + b)^2 + c$.
(b) Hence sketch the curve $y = -f(x)$.
4. A curve has equation $y = 2x^3 + 3x^2 - 12x + 2$.
Find the stationary points of this curve and determine their nature.

5. The diagram opposite shows the graph of

$$y = x^3 - 12x - 16$$

- (a) Find the coordinates of A and B.
- (b) Find the coordinates of the turning point C.



6. A curve has equation $f(x) = x^3 + 6x^2 - 36x + 40$.
 - (a) Find the coordinates of the turning points of $f(x)$ and determine their nature.
 - (b) Find where the curve meets the x-axis.
 - (c) Make a sketch of $f(x)$ showing clearly its turning points and where it cuts the x-axis.
7. (a) Show that the function $f(x) = x^3 + 3x^2 + 3x - 15$ is never decreasing.
(b) Find the coordinates of the stationary point of $f(x)$.

